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EXAMINER

HU, HENRY S

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/530,226	Applicant(s) UENSAL ET AL.	
	Examiner HENRY S. HU	Art Unit 1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Amendment of June 4, 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-34 is/are pending in the application.
- 4a) Of the above claim(s) 25-31 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-24 and 32-34 is/are rejected.
- 7) ☒ Claim(s) 1 is/are objected to.
- 8) ☒ Claim(s) 1-34 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 August 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. USPTO has received Amendment filed on June 4, 2009, which is in response to Non-Final action filed on March 4, 2009. With such an amendment, **Claims 1-3, 12 and 19-26 are amended; new Claims 32-34 are added, while no claim is cancelled.** To be more specific, parent **Claims 1 and 25** is each rewritten in two ways including; (A) to obtain the polyazole blends by process (1) or (2), and (B) the step D1 or D2 is specifically done by step of hydrolysis treatment on the sheet-like structure formed on C1 or C2 so as to become self-supporting. **New parent Claim 32 is directly related to the polymer membrane of parent Claim 1 but using specified polymer B.** New Claims 32-34 are thereby joined with elected group I (Claims 1-24).

This application **10/530,226** is filed according to 371/PCT/EP03/10905, which carries a foreign priority at October 4, 2002. USPTO has received three IDS' (total 4 pages) so far. **Claims 1-34** with three independent claims (**Claims 1, 25 and 32**) are now pending, while non-elected Claims 25-26 (Group II) and Claims 27-31 (Group III) are still withdrawn from consideration by the examiner. An action follows.

Response to Argument

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2. Applicant's argument filed on June 4, 2009 has been fully considered but they are not persuasive. The focal arguments related to the patentability will be addressed as follows: **Two** parent claims including **Claim 1** and newly added **Claim 32** is now pending. Parent **Claims 1** is rewritten in **two** ways including: (A) to obtain the polyazole blends by process (1) or (2), and (B) the step D1 or D2 is done by step of **hydrolysis** treatment on the sheet-like structure formed on C1 or C2 so as to become self-supporting. **New parent Claim 32 is directly related to polymer membrane of parent Claim 1 but using a specified polymer B.** Current parent Claims 1 and 32 thereby has different scope from previous parent Claim 1.

After new search, previous two 103(a) rejections are now modified with additional teaching from “**new**” **reference Calundann (984)**, while new 102(e) rejection by “**new**” **reference Calundann (984)** is applied. The use of Calundann (984) is to teach both two new amended subject matters. **Final office action is thereby applied** according to MPEP as follows.

Claim Objections

3. **Claim 1 is objected to** because of the following informalities:

(a) On **Claim 1** at line 3 (from the end), the vague language of “obtainable” is improper according to MPEP. A correction to “**obtained**” is needed. Otherwise, it is unclear whether it is actually obtained or not.

(b) On **Claim 1** at line 2, the word “end” needs to change to “**and**”.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. The limitation of “once-amended” parent **Claim 1** of the present invention relates to a ***proton-conducting polymer membrane, which comprises polyazole blends and is obtained by a process (1) or (2) wherein process (1) comprising four steps including:***

(A1) preparation of a mixture comprising polyphosphoric acid, at least one polyazole (polymer A) and/or one or more compounds which are suitable for forming polyazoles under the action of heat according to step (B1),

(B1) heating of mixture obtained according to step (A1) under inert gas to temperatures of up to 400°C,

(C1) application of a layer using the mixture from step (B1) to a support to form a sheet-like structure,

(D1) treating said sheet-like structure formed in step (C1) with hydrolysis until it is self-supporting,

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or wherein process (2) comprising four steps including:

*(A2) preparation of a mixture comprising **polyphosphoric acid**, at least one polyazole (polymer A) and/or one or more compounds which are suitable for forming polyazoles under the action of heat according to step (C2),*

(B2) application of a layer using the mixture from step (A2) to a support to form a sheet-like structure,

(C2) heating of mixture obtained according to step (B2) under inert gas to temperatures of up to 400°C,

(D2) treating said sheet-like structure formed in step (C2) with hydrolysis until it is self-supporting,

wherein at least one further polymer (polymer B) which is not a polyazole is added to the composition obtained according to step (A1) or (A2) and the weight ratio of polyazoles to polymer B is in the range from 0.1 to 50.

Newly added parent **Claim 32** is directly related to polymer membrane of parent **Claim 1** but using specified polymer B.

*See other limitations of dependent **Claims 2-24 and 33-34**.*

6. **Claims 1-24 and 32-34** are rejected under 35 U.S.C. 102(e) as being anticipated by **Calundann et al. (US 7,540,984 B2** with US effective filing date at April 9, 2001 and with different assignee).

Regarding “**proton-conducting polymer “blend” membrane**” limitation of two parent claims including **Claim 1 and newly added Claim 32**, three components are mixed for heating, then applying on substrate and finally forming a self-supporting membrane. The three components are: (A) a polyazole type polymer (or made from its precursor), and (B) a different polymer (other than polyazole type), and (C) polyphosphoric acid, wherein polymer (A) and polymer (B) will make a polymer blend according to the art.

With current amendment, the original process in Claim 1 is rewritten into process (1) and process (2), wherein the difference between both processes is the sequence of the second step and the third step. In summary, parent **Claims 1 and 32** is now pending and is each including: (A) to obtain the polyazole blends by process (1) or (2), and (B) the step D1 or D2 is done by step of hydrolysis treatment on the sheet-like structure formed on C1 or C2 so as to become self-supporting.

7. Polyazole type polymer or such polyazole type polymer obtained from its precursors based on dependent **Claims 2-11** can be summarized to be polyimidazole, polybenzimidazole, polybenzothiazole, polybenzoxazole, polytriazole, polyoxadiazole, polythiadiazole, polypyrazole and the like polymer. It is noted that open language “**comprising**” is applied to membrane composition and the process (1) or (2) of parent Claim 1.

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8. **Calundan (984)** has already prepared some proton-conducting electrolyte type “polymer membranes” in two different process including process (1) and process (2) (see process (1) and process (2) in Claim 1 on column 21, line 34-65) to be particularly useful for making solid polymer electrolyte membrane/electrode assembly in **fuel cell operation** (column 1, line 11-15). Such a polymer membrane is achieved by **dissolving polyazole type polymer in aprotic solvent such as polyphosphoric acid**, while hydrolysis treatment is indeed applied on step D1 or D2 until it is self-supporting.

Attention is directed to the fact that other polymer (to be useful as polymer B) such as **perfluorinated polymer with sulfonic acid** (see the use of **Nafion** polymer at line 45, 0.1-20 wt%; it reads on the polymer B-(f) on new Claim 32) can be also added as additives (see column 13, line 16-45) so as to improve performance for oxygen solubility and diffusion. With respect to the formation of “sheet-like structure” on the substrate, the coating is in the form as a flat layer with some thickness (see column 14, line 33 and 47-49). Therefore, Calundan (984) clearly anticipates the limitation of Claim 1 and Claim 32.

9. Regarding **Claims 2-11**, various polyazole type polymers cited by Calundan (984) as well as the references cited therein read on limitations of Claims 2-11.

Regarding **Claims 12-18**, reinforcing polymers cited by Calundan (984) as well as the references cited therein read on limitations of Claims 12-18.

Regarding **Claims 19-24 and 33-34**, the conditions in making proton-conducting electrolyte type “polymer blend membranes” as well as the hydrolysis treatment have been disclosed by Calundan (984) and the references cited therein.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

11. **Claims 1-24 and 32-34 are rejected** under 35 U.S.C. 103(a) as being unpatentable over Sakaguchi et al. (US 2004/0062969 A1) in view of Cui et al. (US 6,869,980 B2) and **Calundann et al. (US 7,540,984 B2)** for the reasons set forth in paragraphs **6-11** of office action dated 3-4-2009 as well as the discussion below.

12. **Claims 1-24 and 32-34 are rejected** under 35 U.S.C. 103(a) as being unpatentable over Cui et al. (US 6,869,980 B2) in view of **a combination of two** references including Matsuoka et al. (US 6,335,419 B2) and Calundann et al. (US 7,235,320 B2) and **Calundann et al. (US 7,540,984 B2)** for the reasons set forth in paragraphs **12-18** of office action dated 3-4-2009 as well as the discussion below.

13. **For the above-mentioned modified 103 rejections**, with current amendment on two parent claims including Claims 1 and 32, Cui, Matsuoka and Calundann (320) in combination is “now” further silent of **two** things including: (A) to obtain the polyazole blends by process (1) or (2), and (B) the step D1 or D2 is done by step of **hydrolysis** treatment on the sheet-like structure formed on C1 or C2 so as to become self-supporting. Both two silent things (A) and (B) can be taught by Calundann (984) as discussed in paragraphs 6-9. The advantage is to provide diversified and novel fuel cell applications (column 1, line 11-15). Therefore, previous two 103(a) rejections are now modified with additional teaching from **“new” reference Calundann (984)**.

14. In summary, previous two 103(a) rejections are now modified with additional teaching from **“new” reference Calundann (984)**, while new 102(e) rejection by **“new” reference Calundann (984)** is applied. The use of Calundann (984) is to teach both two newly added subject matters on parent Claims 1 and 32. **Final office action is thereby applied** according to MPEP. Further amendment on parent Claim 1 and Claim 32 is suggested.

Conclusion

15. Applicant's amendment **necessitated the new ground(s) of rejection presented in this Office action**. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

16. Any inquiry concerning this communication or earlier communication from the examiner should be directed to **Dr. Henry S. Hu whose telephone number is (571) 272-1103**. The examiner can be reached on Monday through Friday from 9:00 AM –5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dr. Vasu Jagannathan, can be reached on (571) 272-1119. The **fax** number for the

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organization where this application or proceeding is assigned is **(571) 273-8300** for all regular communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Peter D. Mulcahy/
Primary Examiner, Art Unit 1796

/Henry S. Hu/
Examiner, Art Unit 1796

August 30, 2009